



Contents lists available at ScienceDirect

## Obesity Research &amp; Clinical Practice

journal homepage: [www.elsevier.com/locate/orcp](http://www.elsevier.com/locate/orcp)

## Original Article

## The interaction between dietary patterns and melanocortin-4 receptor polymorphisms in relation to obesity phenotypes



Zohreh Mousavizadeh<sup>a,1</sup>, Firoozeh Hosseini-Esfahani<sup>b,1</sup>, Amir Javadi<sup>c</sup>,  
Maryam S Daneshpour<sup>d</sup>, Mahdi Akbarzadeh<sup>d</sup>, Maryam Javadi<sup>a,e,\*\*</sup>, Parvin Mirmirian<sup>b,f,\*</sup>,  
Fereidoun Azizi<sup>g</sup>

<sup>a</sup> Department of Nutrition, School of Health, Qazvin University of Medical Sciences, Qazvin, Iran

<sup>b</sup> Nutrition and Endocrine Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>c</sup> Department of Social Sciences, School of Medicine, Qazvin University of Medical Sciences, Qazvin, Iran

<sup>d</sup> Cellular and Molecular Endocrine Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>e</sup> Children Growth Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

<sup>f</sup> Department of Clinical Nutrition and Dietetics, Faculty of Nutrition and Food Technology, National Nutrition and Food Technology Research Institute, Shahid Beheshti University of Medical Sciences, Tehran, Iran

<sup>g</sup> Endocrine Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran

## ARTICLE INFO

## Article history:

Received 25 February 2020

Received in revised form 4 April 2020

Accepted 14 April 2020

## Keywords:

Dietary patterns

MC4R polymorphisms

Central obesity

General obesity

Interaction

## ABSTRACT

**Introduction:** Data shows that interactions between dietary factors and genetic variants can modulate the association of polymorphisms such as the Melanocortin-4 receptor (MC4R) gene with obesity. Considering the limited data available on this topic we aimed to investigate interactions between dietary patterns (DPs) and MC4R polymorphisms in relation to obesity phenotypes.

**Methods:** This cohort study was performed in the framework of Tehran Lipid and Glucose Study; for eligible participants in this study ( $n = 3850$ ), the median follow-up was 4 years. DPs were determined using factor analysis. The genotypes of polymorphisms (17782313rs and 12970134rs) were identified and their interaction with DPs were assessed in relation to incidence of obesity phenotypes including central obesity, general obesity and visceral adiposity dysfunction.

**Results:** The mean age of participants (62.5% females) were  $37.0 \pm 13.7$  years. Two main DPs (healthy and unhealthy) were extracted. C-allele carriers of rs17782313 in higher quartiles of the healthy DP score had a significant decrease in the incidence of general obesity, compared to those who had the TT genotype (HR = 0.61, 95% CI = 0.42–0.89, P interaction = 0.01). For rs12970134 A-allele carriers, subjects in the second compared to the first quartile of the healthy DP score, had a significant decrease in the incidence of general obesity (HR = 0.68, 95% CI = 0.46–0.99). There were no significant interaction between DPs and MC4R variants in relation to other obesity phenotypes.

**Conclusion:** Our results indicate that the healthy DP could interact with rs17782313 in relation to incidence of general obesity.